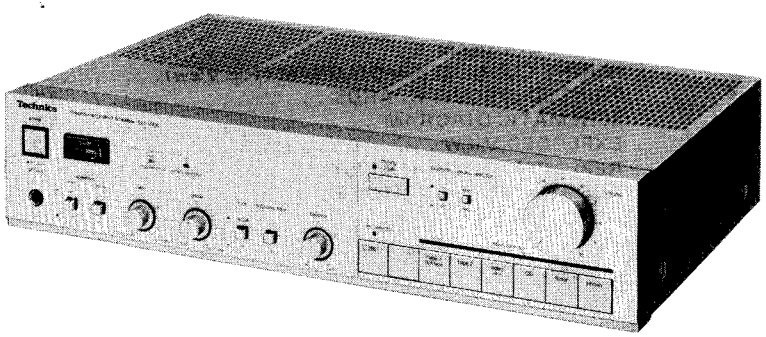
ORDER NO. HAD840728620

Service Manual

Amplifier

SU-V4X

Computer Drive New Class A
Stereo Integrated Amplifier



Color

(S) ····Silver type
(K) ····Black type

Color	Area
(S)(K)	[E] ···· Scandinavia
(S)(K)	[EGA] ··F.R. Germany
(S)(K)	[EK] ··· United Kingdom
(S)	[EF] ··· France
(S)(K)	[EH] ··· Holland
(S)(K)	[EB] ··· Belgium
(S)(K)	[Ei] ···· Italy
(S)(K)	[XL] ··· Australia
(S)(K)	[XA] ··· Asia, Oceania, Africa, Middle Near East and Latin America
(S)(K)	[PA] ··· Far East PX
(S)(K)	[PE]··· European Military

SPECIFICATIONS

(DIN 45 500)

■ AMPLIFIER SECTION

1 kHz continuous power output
both channels driven 2×70 W (4Ω)
2×70 W (8Ω)

20 Hz~20 kHz continuous power output
both channels driven 2×65 W (4Ω)
2×65 W (8Ω)

Total harmonic distortion
rated power at 20 Hz~20 kHz 0.03% (4Ω)
0.004% (8Ω)
rated power at 1 kHz 0.007% (4Ω)
0.003% (8Ω)
half power at 20 Hz~20 kHz 0.003% (8Ω)
half power at 1 kHz 0.001% (8Ω)

Intermodulation distortion
rated power at 250 Hz: 8 kHz=4:1, 8Ω 0.03%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0.004%

Power bandwidth
both channels driven, −3 dB 5 Hz~50 kHz (4Ω, 0.03%)
5 Hz~60 kHz (8Ω, 0.02%)

Residual hum and noise 0.9 mV
Damping factor 30 (4Ω), 60 (8Ω)

Input sensitivity and impedance
PHONO MM 2.5 mV/47 kΩ
MC 170 μV/220Ω
TUNER, CD, VIDEO/AUX 150 mV/22 kΩ
TAPE 1/DA TAPE, TAPE 2 150 mV/22 kΩ

PHONO maximum input voltage (1 kHz, RMS)
MM 160 mV
MC 12 mV

S/N
rated power (4Ω)
PHONO MM 76 dB (IHF, A: 86 dB, input 2.5 mV)
MC 64 dB (IHF, A: 68 dB, input 250 μV)
TUNER, CD, VIDEO/AUX, TAPE 1/DA TAPE, TAPE 2 91 dB (IHF, A: 102 dB)

Frequency response
PHONO RIAA standard curve ±0.8 dB (30 Hz~15 kHz)
TUNER, CD, VIDEO/AUX, TAPE 1/DA TAPE, TAPE 2 5 Hz~120 kHz (−3 dB) +0, −0.2 dB (20 Hz~20 kHz)

Tone controls
BASS 50 Hz, +10 dB~−10 dB
TREBLE 20 kHz, +10 dB~−10 dB

Muting −20 dB
Subsonic filter 30 Hz, −6 dB/oct.
Loudness control (volume at −30 dB) 50 Hz, +9 dB
Output voltage
REC OUT 150 mV
Channel balance, VIDEO/AUX 250 Hz~6,300 Hz ±1 dB
Channel separation, VIDEO/AUX 1 kHz 60 dB
Headphones output level and impedance 540 mV/330Ω
Load impedance
MAIN or REMOTE 4Ω~16Ω
MAIN and REMOTE 8Ω~16Ω

Technics

Panasonic Tokyo
Matsushita Electric Industrial Co., Ltd.
1-2, 1-chome, Shibakoen, Minato-ku, Tokyo 105 Japan

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

■ GENERAL

Power consumption	390 W
Power supply	
For United Kingdom	AC 50 Hz/60 Hz, 110 V/120 V/220 V/240 V
For continental Europe	AC 50 Hz/60 Hz, 220 V
For others	AC 50 Hz/60 Hz, 110 V/120 V/220 V/240 V
Dimensions (W×H×D)	430×97×290 mm (16-15/16"×3-27/32"×11-7/16")
Weight	6.7 kg (14.8 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Specifications are subject to change without notice for further improvement.

■ CONTENTS

	Page
SAFETY PRECAUTION	2
LOCATION OF CONTROLS	3
PROTECTION CIRCUITRY	4
BEFORE REPAIR AND ADJUSTMENT	4 ~ 6
TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S	6
FUNCTION OF TERMINAL (ICQ control IC21: MN1404STE)	7
FUNCTION OF TERMINAL (Analog function control IC401: SVIUPD7506C043)	8
BLOCK DIAGRAM	9, 10
WIRING CONNECTION DIAGRAM (Top View)	11, 12
PRINTED CIRCUIT BOARDS	13 ~ 15
SCHEMATIC DIAGRAM	16 ~ 20
EXPLODED VIEW	21, 22
REPLACEMENT PARTS LIST	23
RESISTORS & CAPACITORS	24

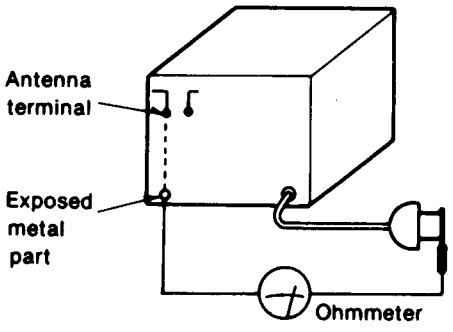
■ SAFETY PRECAUTION

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

• INSULATION RESISTANCE TEST

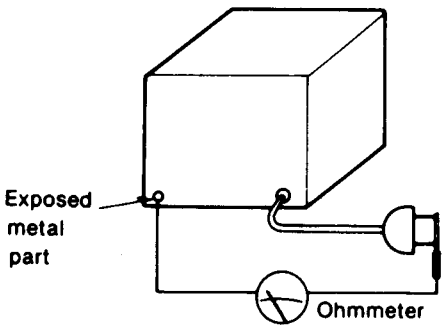
1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screwheads antenna, control shafts, handle brackets, etc. Equipment with antenna terminals should read between 3MΩ and 5.2MΩ to all exposed parts. (Fig. A) Equipment without antenna terminals should read approximately infinity to all exposed parts. (Fig. B)

Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.



(Fig. A)

Resistance = 3MΩ—5.2MΩ

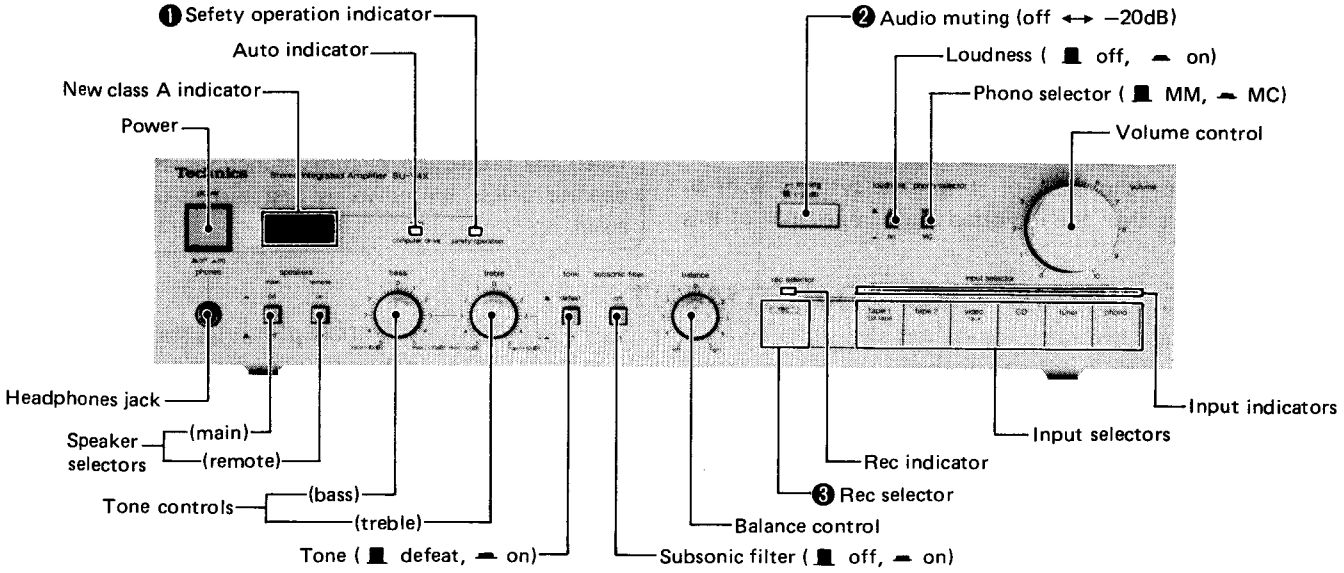


(Fig. B)

Resistance = Approx ∞

4. If the measurement is outside the specified limits, there is a possibility of a shock hazard. The equipment should be repaired and rechecked before it is returned to the customer.

■ LOCATION OF CONTROLS



❶ Sefety operation indicator

When the power is switched on, this indicator flashes on and off for about 5 seconds, and then illuminates steadily when the unit is in the operation condition. If an abnormal condition in the circuitry is detected, such as DC voltage appearing in the output, or a short-circuit of the positive (+) and negative (−) cords from the speaker terminals, the protection circuit functions and this indicator flashes rapidly. If this occurs, switch the power off, find the cause of the trouble and correct it, and then switch the power on once again.

❷ Audio muting

Set to the "−20 dB" position when a disc is being changed or to temporarily reduce the volume level.
(The indicator will be illuminated.)
In addition, the volume level can be adjusted more precisely if this switch is set to the "−20 dB" position for listening at a low volume level.

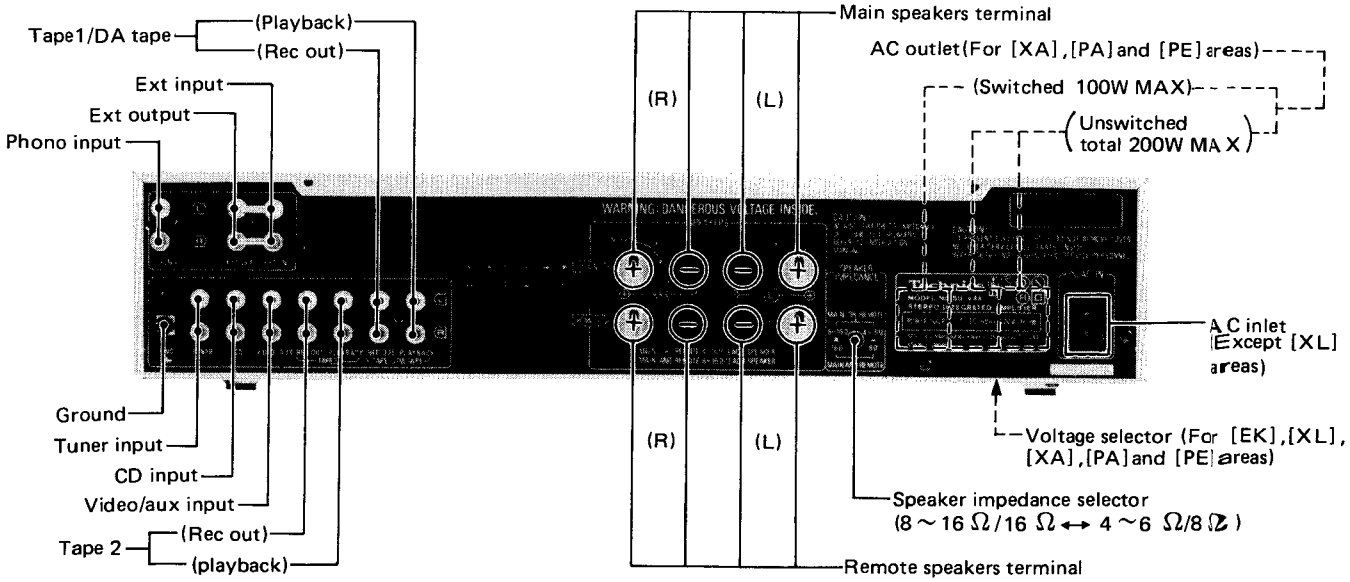
❸ Rec selector

This button can be used to select another program source to listen to while recording from one tape to another tape or while recording from some other program source.
When this button is pressed, the recording mode indicator flashes, and, when one of the selectors is pressed, this indicator illuminates.
If the indicator flashes, the flashing can be stopped by pressing this switch once again.

When the recording mode indicator is not illuminated:
If one of the selectors is pressed, the sound source to be listened to and the recording sound source will both be switched at the same time.
Note, however, that only the sound source to be listened to will be switched, and the tape can be monitored during recording, if the "tape 1/DA tape" or "tape 2" selectors are pressed.

When the recording mode indicator is flashing:
If one of the selectors is pressed, only the recording sound source will be switched.

When the recording mode indicator is illuminated:
If one of the selectors is pressed, only the sound source to be listened to will be switched.



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different.

* [EK, XL, XA, PA and PE] areas are provided with voltage selector.
* 220V (50/60Hz) for Continental Europe.
* Phono input capacitance is about 150pF.

■ PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during a performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of this unit are used.

If this occurs, follow the procedure outlines below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again after one minute.

Note

When the protection circuitry functions, the unit will not operate unless the power is first turned off and then on again.

■ BEFORE REPAIR AND ADJUSTMENT

1. Turn off the power supply and short-circuit of power supply capacitors (C701, C702 10000μF) at resistance (about 10Ω,5W) in order to discharge the charged voltage. Do not short between C701, C702 by screwdriver. It may damage the component.
2. Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a power supply voltage controller to make sure that the consumed current is free of abnormality. The consumed current at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110V/120V/220V/240V.

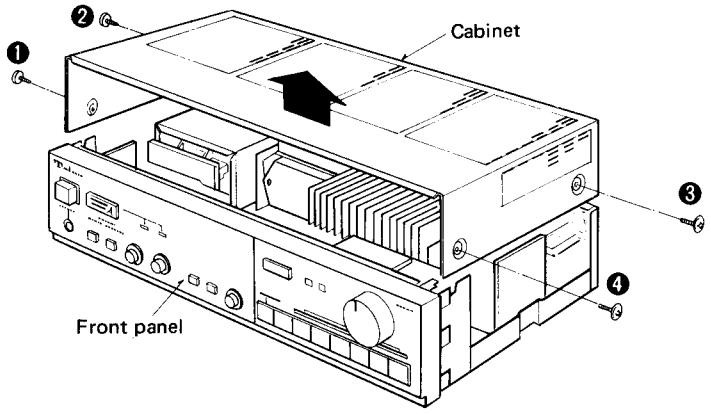
Power supply voltage		AC110V	AC120V	AC220V	AC240V
Cousumed current	50Hz	220 ~ 440mA	210 ~ 430mA	110 ~ 220mA	100 ~ 210mA
	60Hz	——	240 ~ 480mA	——	——

■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1 — **How to remove the cabinet**

Procedure 1

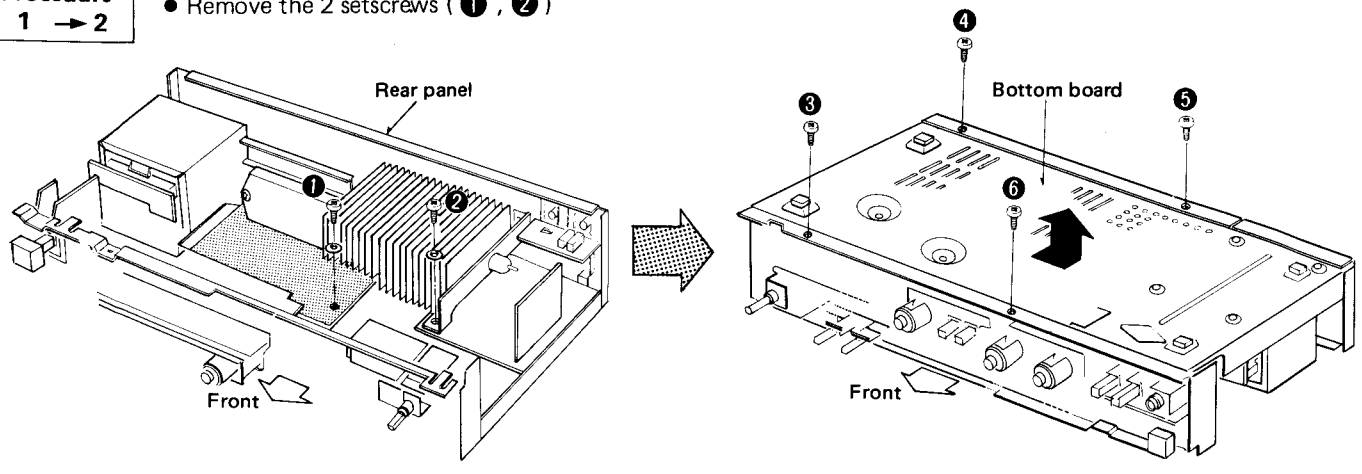
- Remove the 4 setscrews (❶ ~ ❹)



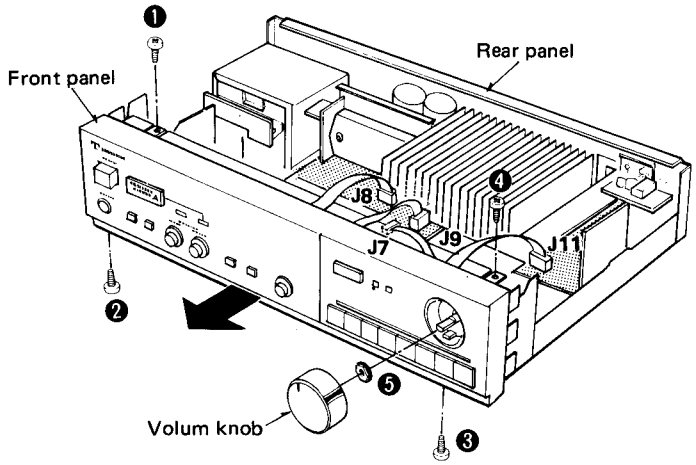
Ref. No. 2 — **How to remove the bottom board**

Procedure 1 → 2

- Remove the 2 setscrews (❶ , ❷)
- Remove the 4 setscrews. (❸ ~ ❻)

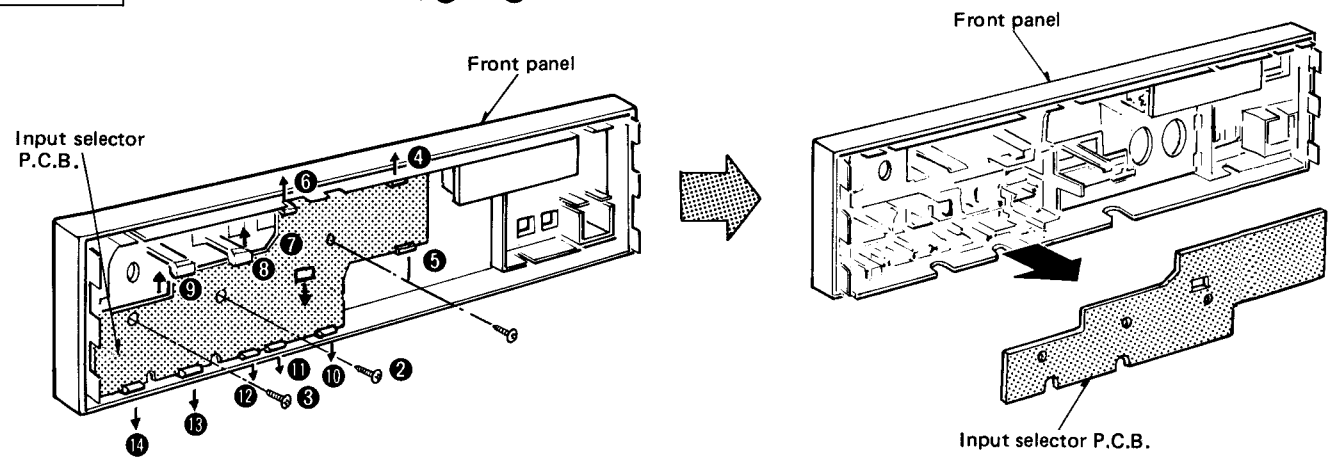


Ref. No. 3	How to remove the front panel
Procedure 1 →3	1. Remove the 4 setscrews. (❶ ~ ❹) 2. Remove the volume knob. 3. Remove the 1 nut. (❺) 4. Pull out the 4 connectors. (J7 ~ J9, J11)



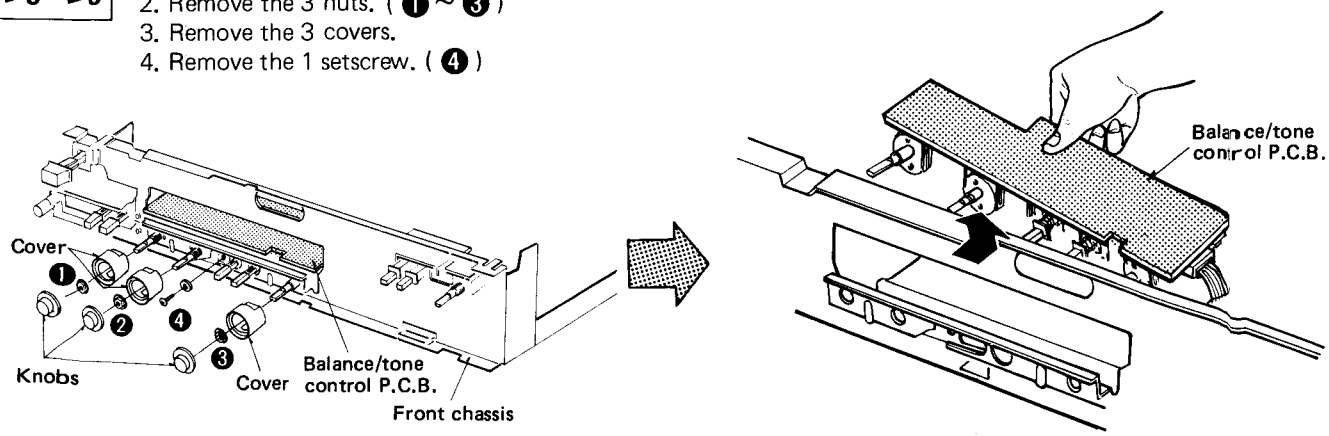
Ref. No. 4	How to remove the input selector P.C.B.
Procedure 1 →3 →4	1. Remove the 3 setscrews. (❶ ~ ❸) 2. Release the 11 claws. (❹ ~ ⓮)

● Remove the input selector P.C.B.



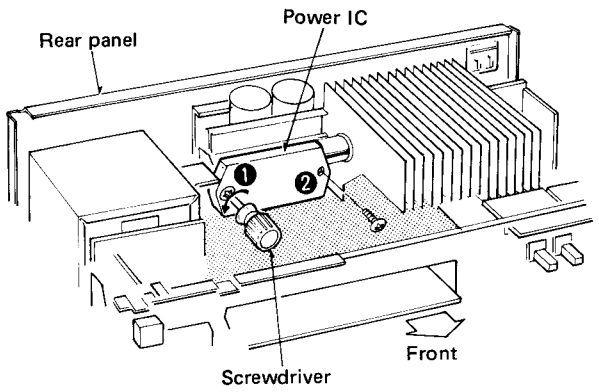
Ref. No. 5	How to remove the balance/tone control P.C.B.
Procedure 1 →3 →5	1. Remove the 3 knobs. 2. Remove the 3 nuts. (❶ ~ ❸) 3. Remove the 3 covers. 4. Remove the 1 setscrew. (❹)

● Remove the balance/tone control P.C.B.



Ref. No. 6	How to remove the power IC
Procedure 1 →2 →3 →5 →6	1. Unsolder the power IC. 2. Remove the 2 setscrews (❶ , ❷)

When mounting the power amplifier IC, apply silicon compound (SZZ0L15) to the rear side of power amplifier IC.



■ TERMINAL GUIDE OF TRANSISTORS, DIODES AND IC'S

MN4069UB 14pin M53242P 16pin MN1404STE 16pin AN7062 18pin TC9163N 28pin UPD7506C043 28pin TC9164N 28pin		AN78M05	2SC1815, 2SA1015 2SC2631, 2SA1123 2SA1112, 2SC3112	SVINJ4559DDM AN6553F
	NO.1	1. Vin 2. GND 3. Vout	E C B	7 6 5 8 1 2 3 4
SVI2004A	2SK170, 2SK301	2SC2592	2SK246	UN4211, UN4212
1 16	1. Drain 2. Gate 3. Source	B C E	Gate Source Drain	E C B C B E
MA162A	MA1160H	MA165, MA167 0A90	SVDAY5533K–M SVDPR5533K	
K A K A	K A K A	K A K A	A K A K	
LN346GP LN446YP	SVDSR1K2 SVDS3V20	SVDMZ424		
A K A K	K A	K A K A		

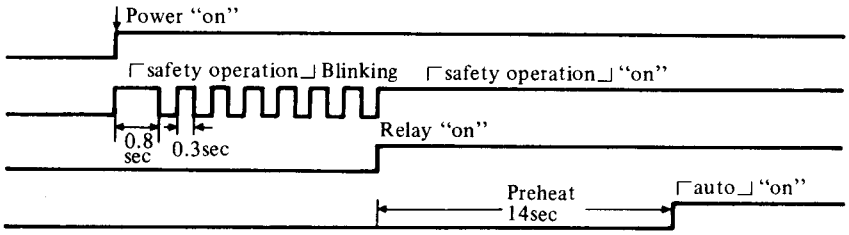
■ FUNCTION OF TERMINAL (ICQ control IC21: MN1404STE)

No.	Symbol	Name of block	Description of terminal
1	VSS	Power supply input terminal	Grounded. (0V)
2	A13	Input port A	Temperature detection circuit. When 60°C (140°F) sensor of power amplifier operates, "H" is put in causing the outputs of terminals 14 ~ 16 to go "H".
3	A12		When effective output 5V signal sensor of L-ch power amplifier operates, "L" is put in causing the output of terminal 14 to go "H".
4	A11		When effective output 2V signal sensors of both-ch power amplifiers operate, "L" is put in causing the output of terminal 15 to go "H".
5	A10		When effective output 5V signal sensor of R-ch power amplifier operates, "L" is put in causing the output of terminal 16 to go "H".
6	TST	Test input terminal	Terminal for testing LSI. (Ground)
7	$\overline{RST}$	Reset input terminal	All outputs are cleared or reset with input at "L". (It is connected to power supply circuit)
8	SNSO	Sensor input terminal	When overload detection circuit of power amplifier output operates, "L" is put in causing the output of terminal 12 to go "L".
9	VDD	Power supply input terminal	Apply 5V.
10	OSC	OSC input terminal	Clock signal (about 415kHz) can be obtained by internal oscillation circuit.
11	CO5	Output port C	When protection circuit operates, "H" and "L" outputs are repeated and "safety operation" indicator blinks.
12	CO4		Output relay and meter relay turn ON with "H" output.
13	CO3		Indicator "auto" lights up at "H".
14	CO2		ICQ control signal is emitted from A input port (temp. sensor, signal sensor). ("H" output)
15	CO1		
16	CO0		

No.	Symbol	Time chart

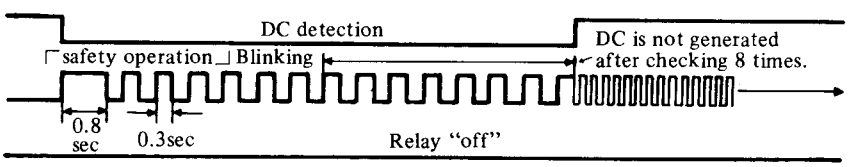
<Power "on" mode>

7	$\overline{RST}$	5V / 0V
11	CO5	5V / 0V
12	CO4	5V / 0V
13	CO3	5V / 0V



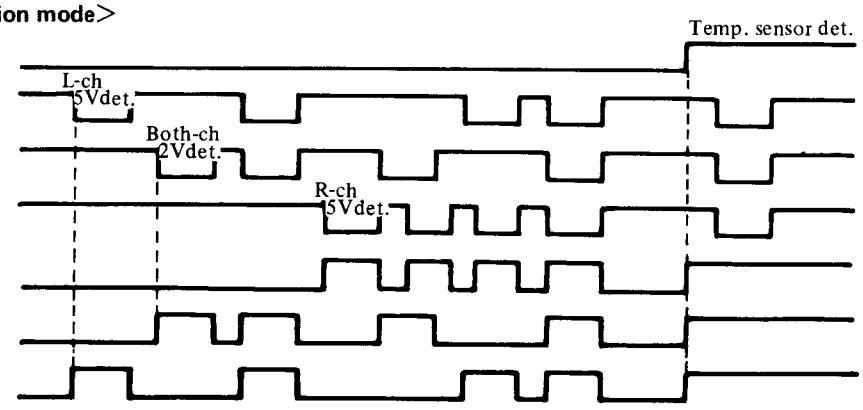
<DC detection or load shorting mode>

8	SNSO	5V / 0V
11	CO5	5V / 0V
12	CO4	0V



<ICQ control operation mode>

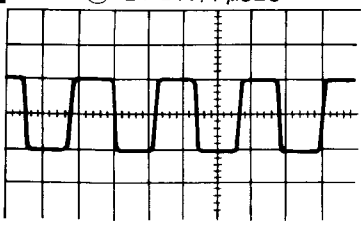
2	A13	5V / 0V
3	A12	5V / 0V
4	A11	5V / 0V
5	A10	5V / 0V
14	CO2	5V / 0V
15	CO1	5V / 0V
16	CO0	5V / 0V



■ FUNCTION OF TERMINAL (Analog function control IC401: UPD7506C043)

Pin. No.	Symbol	Input/Output	Active	Description of terminal
1	P43	Output	H	Indicater "muting" light up at "H". Muting "–20dB" 4.3V / 0V
2	x 2	—	—	Not used in this unit.
3	P03/x 1	Input	—	It detects the level of pin ⑤. Push (once) the "rec selector" Selection of input selector 4.3V / 0V
4	P20/PSTB	Output	H	Clock output port for analog switch. Clock signal output to IC201 pin ⑮ and IC202 pin ⑮ during data transmission. [Refer to A]
5	P21/PTOUT	Output	H	Indicater "rec selector" light up at "H". Push (once) the "rec selector" Selection of input selector 4.3V / 0V
6	P22	Output	H	Data output for analog switch. Data signal output to IC201 pin ⑯ and IC202 pin ⑯. [Refer to A]
7	P23	Output	H	Strobe output port for analog switch. Strobe signal output to IC201 pin ⑬ and IC202 pin ⑬ during data transmission. [Refer to A]
8	P60	Output	H	Rec side indicator 3-bit output. Rec indicator drive signal output to IC403 pins ⑬ ~ ⑮. [Refer to B]
9	P61			
10	P62			
11	P63	Input	H	Stop mode sensing input. With high pulse signal input, the stop command is executed and the mode is shifted to standby. 4.4V / 0V Power switch "OFF"
12	CL1	—	—	External clock oscillation frequency (400KHz) input port. [Refer to C]
13	CL2	—	—	Not used in this unit.
14	V_{DD}	—	—	Power supply input terminal. (Apply 4.3V)
15	RESET	Input	H	Input terminal for reset signal. Power switch "ON" 4.3V / 0V Power switch "OFF" 1V / 0V
16	P10	Input	H	Input terminal for key return signal from external key matrix. [Refer to D]
17	P11			
18	P12			
19	P13			
20	P50	Output	H	Output terminal for key scan signal for external key matrix. (Output voltage is 4.3V)
21	P51			
22	P52			
23	P53	Output	H	Muting signal output during input switch or Rec switch operation. 4.3V / 0V Push the each input selector or muting switch.
24	P00	Input	—	Mode shifting port. [H = Function 1 mode, L = Function 2 mode] The input of this unit is "H" (4.9V) because the mode used is Function 1.
25	P40	Output	H	Input side indicator 3-bit output. Input indicator drive signal to IC402 pins ⑬ ~ ⑮. [Refer to E]
26	P41			
27	P42			
28	V_{SS}	—	—	Ground terminal.

C IC401 ⑫ 2V DIV/1 μSEC



① Push the rec selector switch. ("rec indicator" blinking)
② Push the each input selector switch.

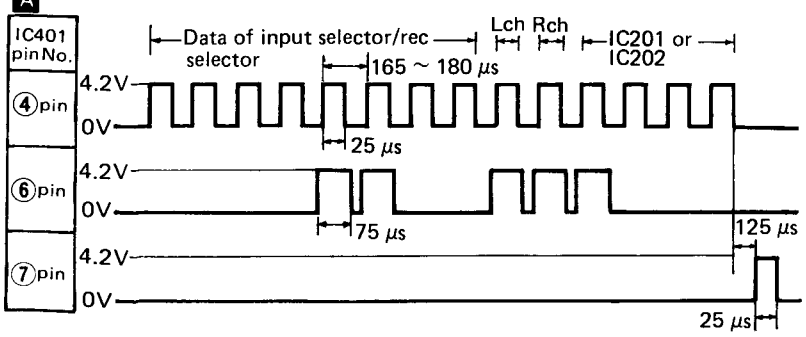
B L = 0V, H = 4.3V

Input selector \ Pin No. of IC401	⑧	⑨	⑩
phono	L	H	L
tuner	H	L	L
CD	L	H	L
video/aux	H	H	L
tape 2	H	L	H
tape 1/AD tape	L	L	H

D L = 0V, H = 4.3V

Input selector \ Pin No. of IC401	⑯	⑰	⑱	⑲
phono	L	L	L	H
tuner	L	L	H	L
CD	L	H	L	L
video/aux	H	L	L	L
tape 2	L	L	H	L
tape 1/DA tape	L	L	L	H
rec selector	H	L	L	L

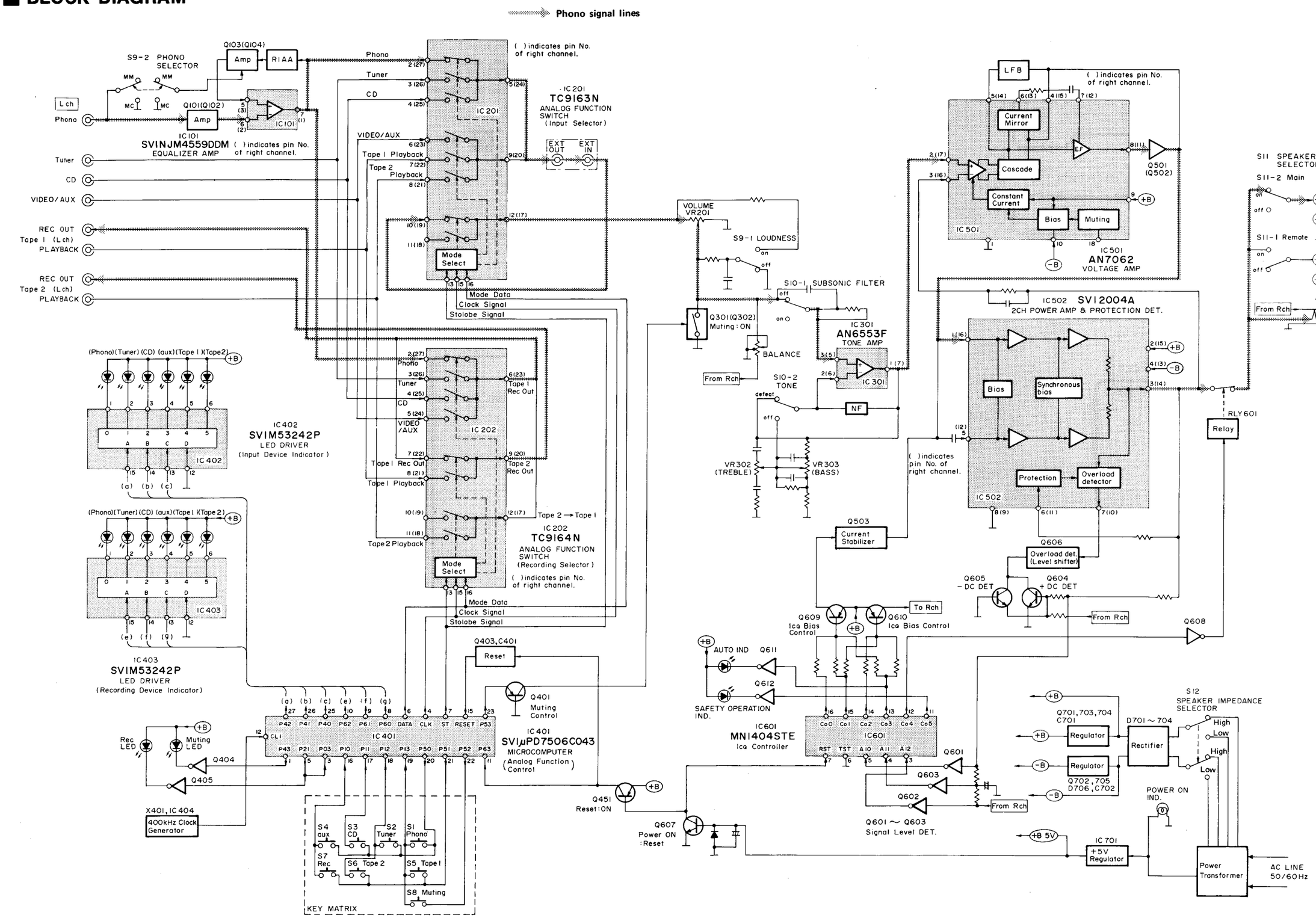
A



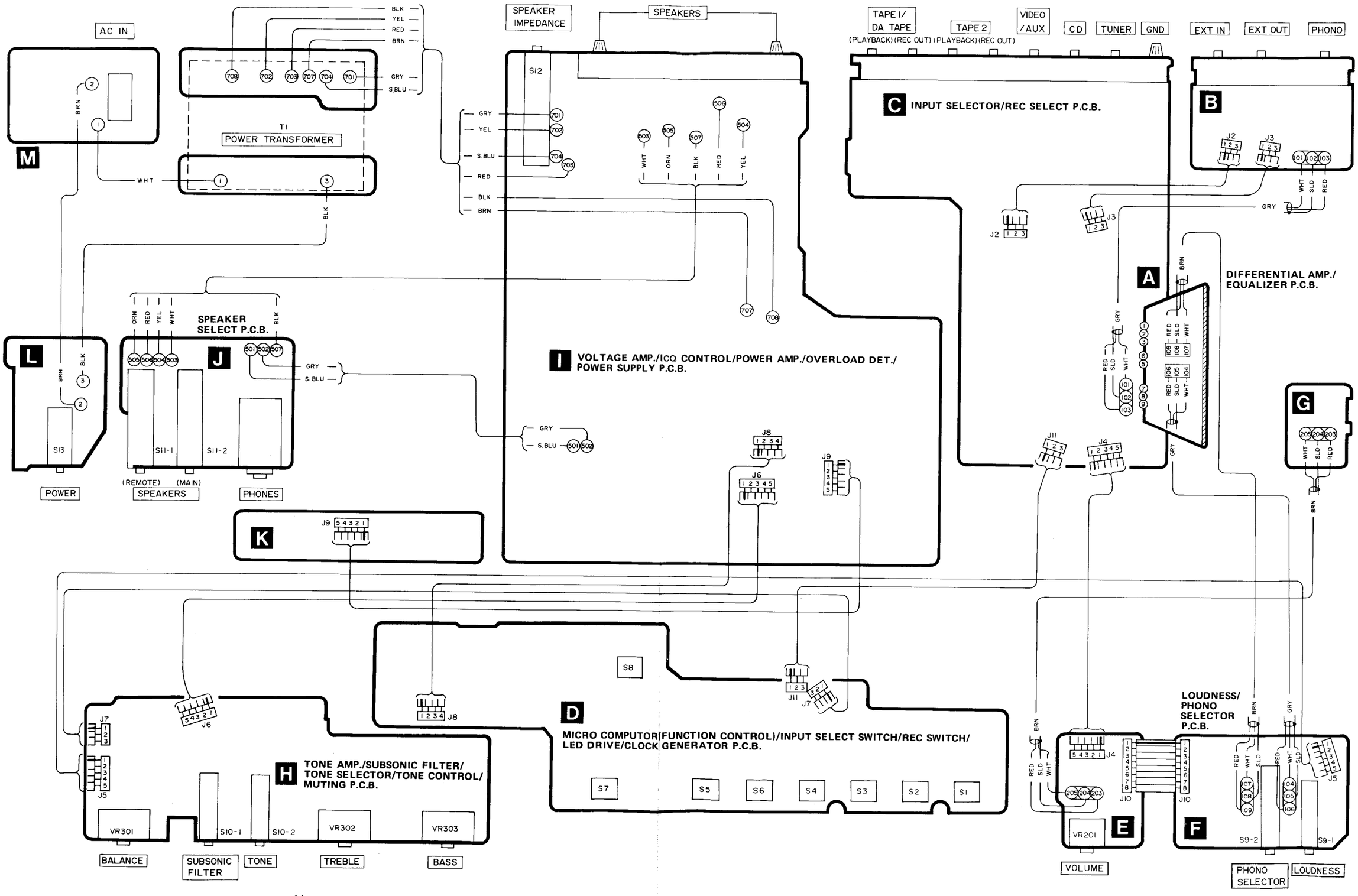
E

Input selector \ Pin No. of IC401	㉕	㉖	㉗
phono	L	L	L
tuner	H	L	L
CD	L	H	L
video/aux	H	H	L
tape 2	H	L	H
tape 1/DA tape	L	L	H
rec selector	L	L	L
muting	L	4.3V / 0V	L

■ BLOCK DIAGRAM

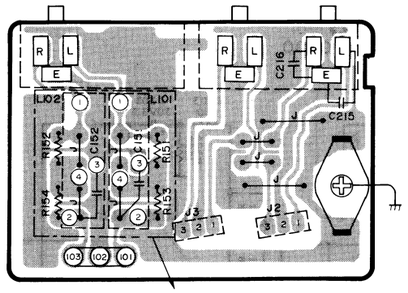


■ WIRING CONNECTION DIAGRAM (Top View)

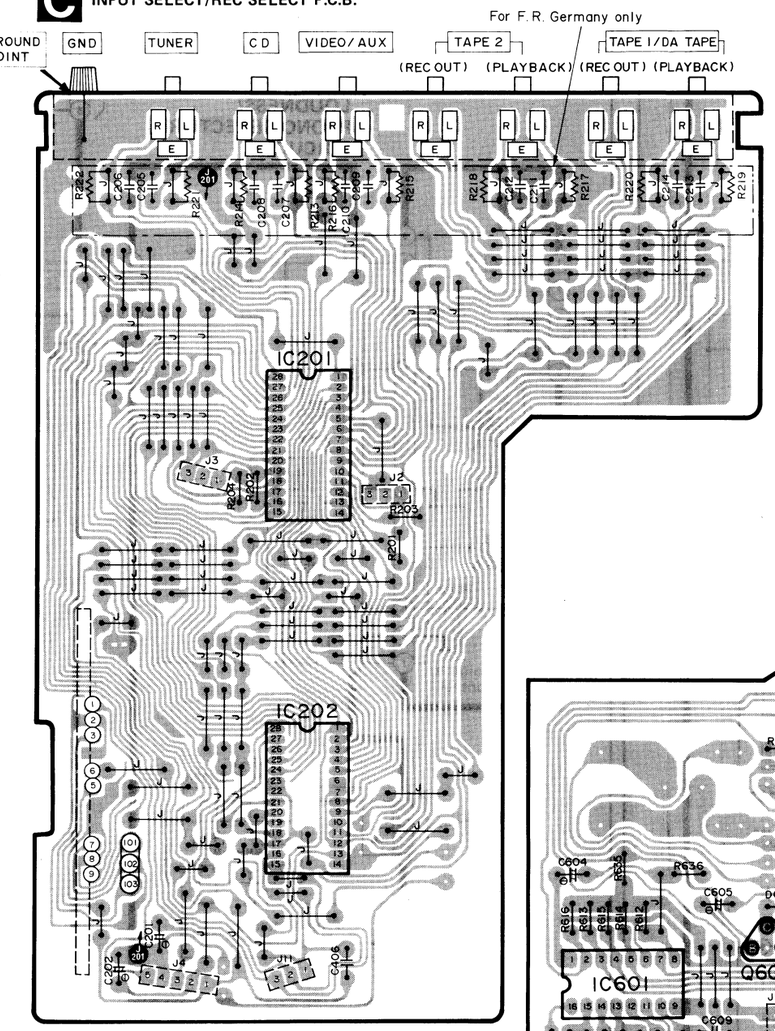


■ PRINTED CIRCUIT BOARDS

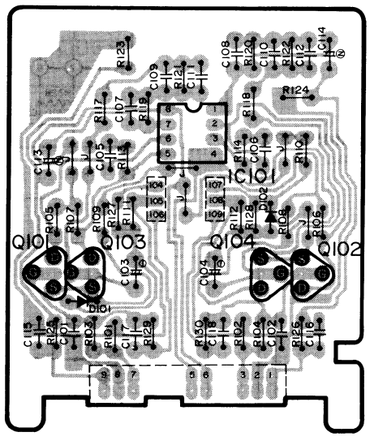
B



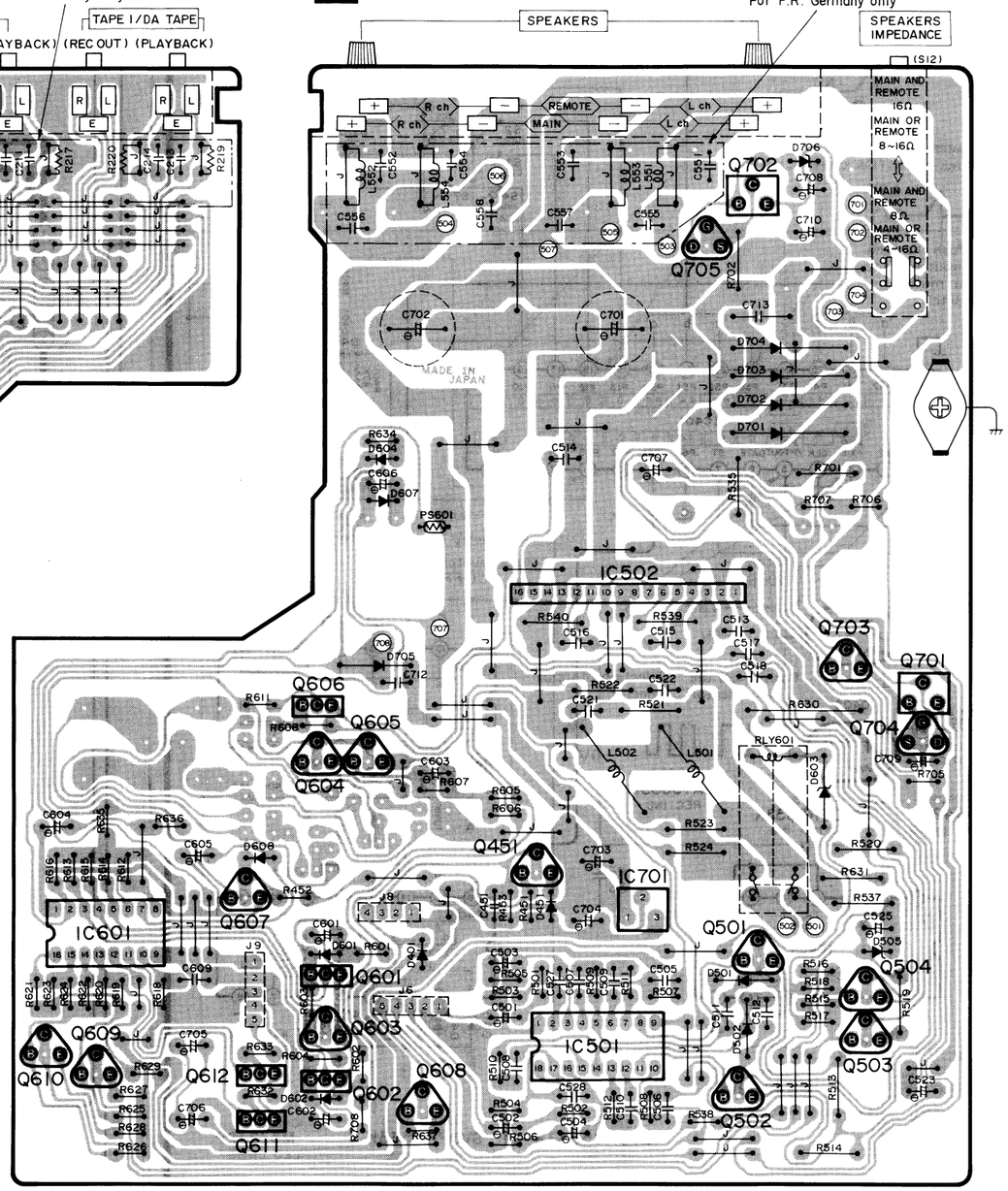
C INPUT SELECT/REC SELECT P.C.B.



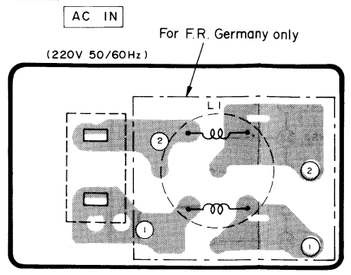
A DIFFERENTIAL AMP./ EQUALIZER P.C.B.

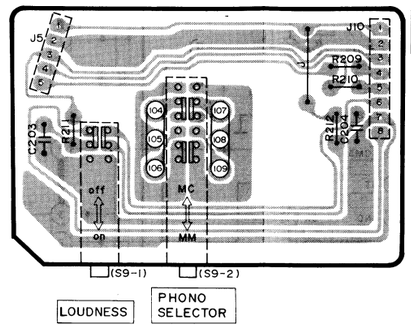


I VOLTAGE AMP./Ico CONTROL/POWER AMP. OVERLOAD DET./POWER SUPPLY P.C.B.

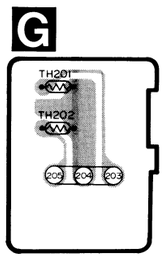


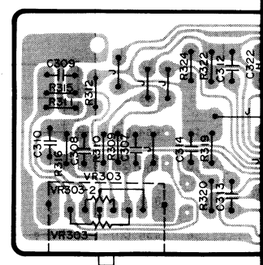
M

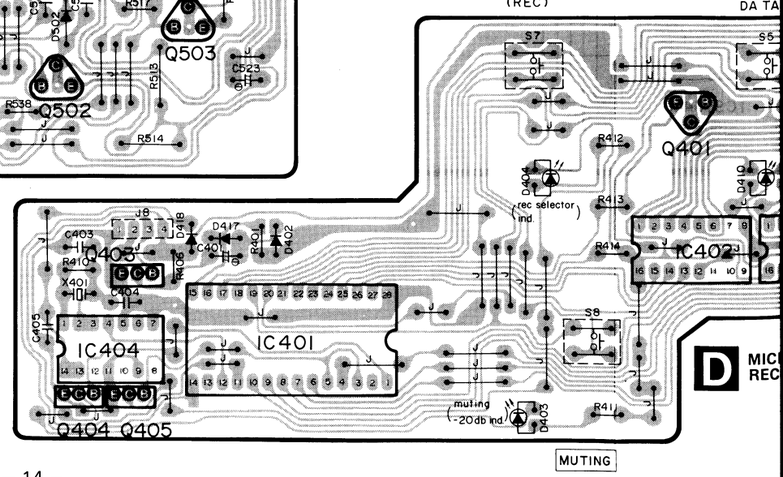




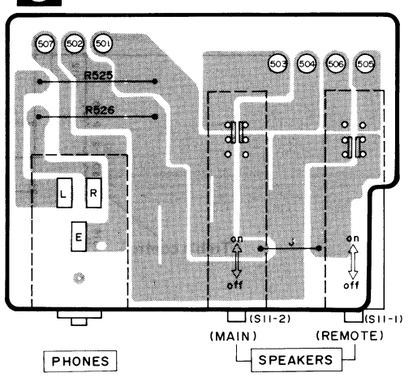
G



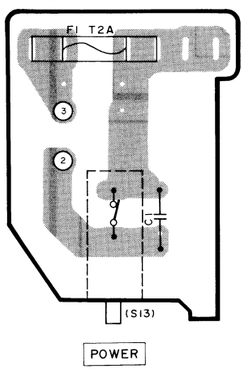




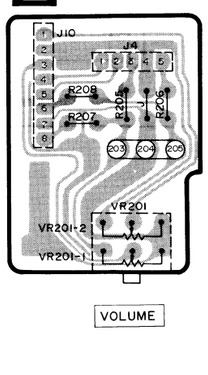
J SPEAKER SELECT P.C.B.



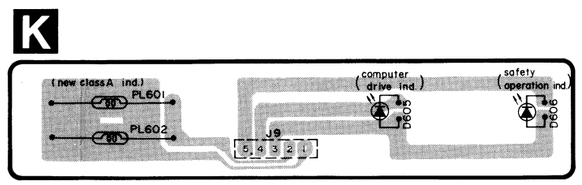
L



E



K



D

I VOLTAGE AMP./Icq CONTROL/POWER AMP. OVERLOAD DET./POWER SUPPLY P.C.B.

M

F LOUDNESS/ PHONO SELECTOR P.C.B.

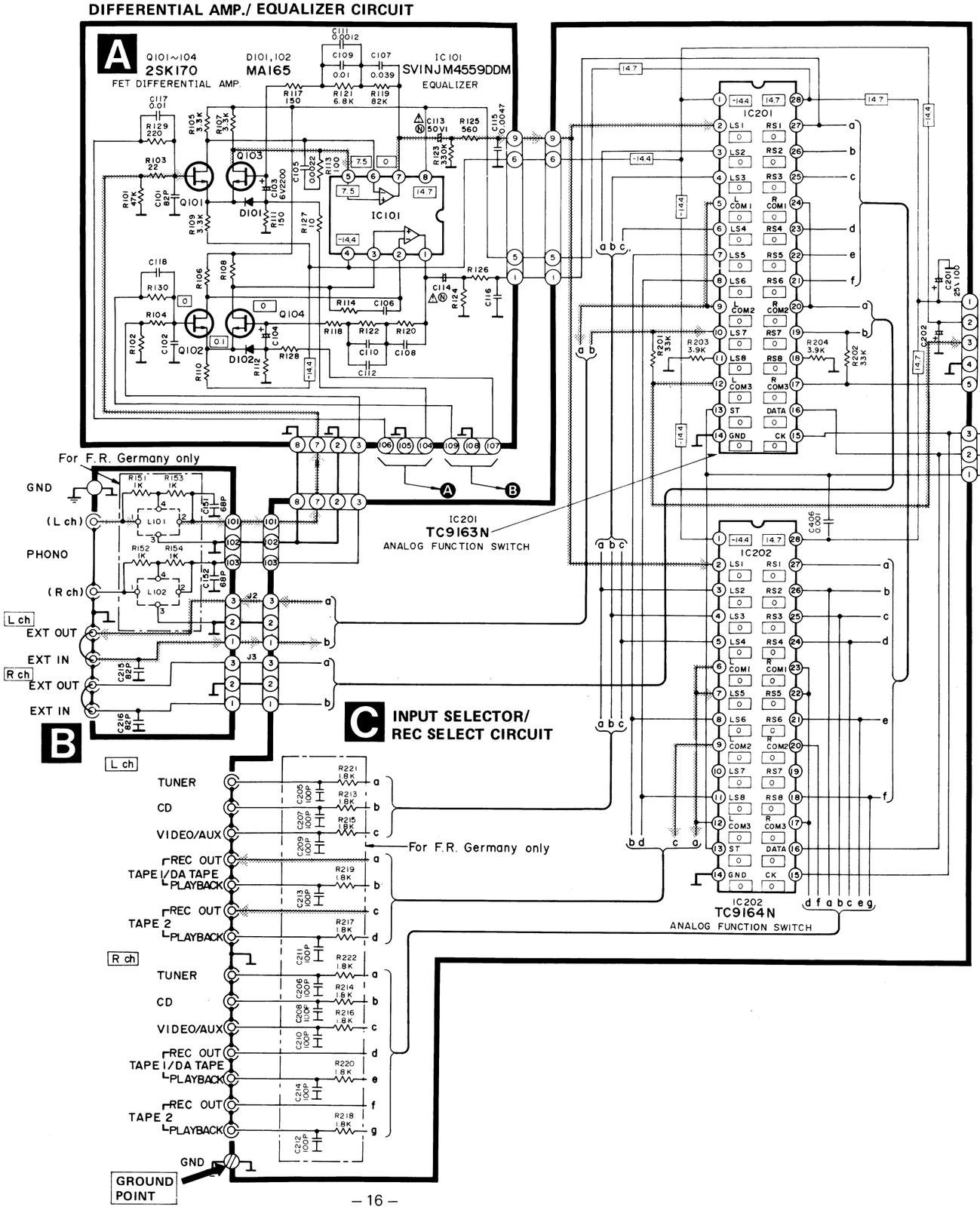
G

H TONE AMP./SUBSONIC FILTER/TONE SELECTOR/ TONE CONTROL/MUTING P.C.B.

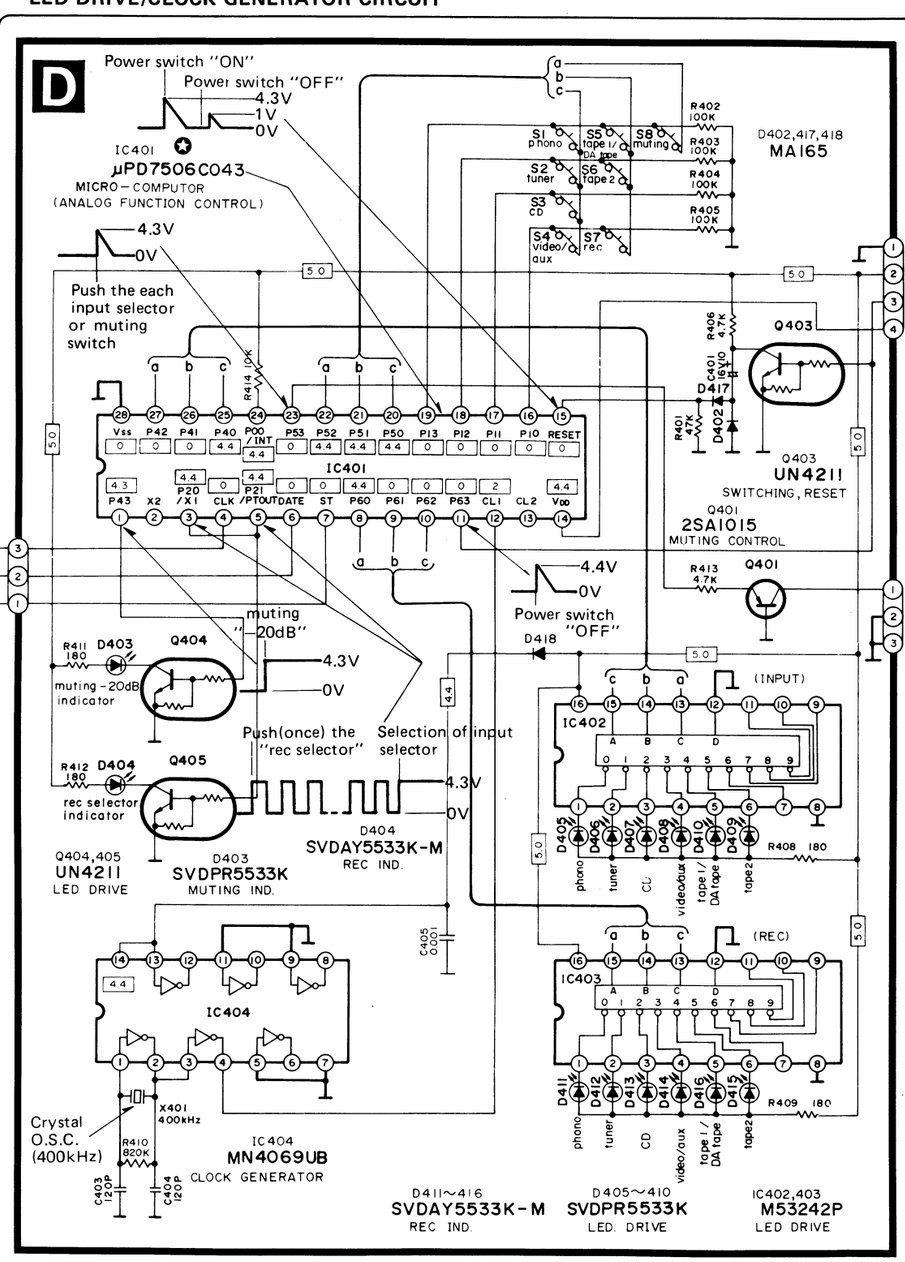
K

D MICRO COMPUTOR(FUNCTION CONTROL)/INPUT SELECT SWITCH/ REC SWITCH/LED DRIVE/CLOCK GENERATOR P.C.B.

DIFFERENTIAL AMP./ EQUALIZER CIRCUIT



MICRO COMPUTOR(FUNCTION CONTROL)/INPUT SELECT SWITCH/REC SWITCH/ LED DRIVE/CLOCK GENERATOR CIRCUIT



5 6 7 8 9 11 12 13 14

MICRO COMPUTOR(FUNCTION CONTROL)/INPUT SELECT SWITCH/REC SWITCH/ LED DRIVE/CLOCK GENERATOR CIRCUIT

D

IC201 IC202 TC9164N LOG FUNCTION SWITCH

IC401 μPD7506C043 MICRO-COMPUTOR (ANALOG FUNCTION CONTROL)

Power switch "ON" 4.3V
Power switch "OFF" 1V 0V

S1 phono, S2 tuner, S3 CD, S4 video/aux, S5 tape1/DA tape, S6 tape2, S7 rec, S8 muting

R402 100K, R403 100K, R404 100K, R405 100K

D402,417,418 MA165

Push the each input selector or muting switch

Q403 UN4211 SWITCHING, RESET

Q401 2SA1015 MUTING CONTROL

Power switch "OFF" 4.4V 0V D418

muting "-20dB" 4.3V 0V

Q404 muting -20dB indicator

Q405 rec selector indicator

Push(once) the "rec selector"

Selection of input selector

IC402 (INPUT)

D404 SVDAY5533K-M REC IND.

Q404,405 UN4211 LED DRIVE

D403 SVDPR5533K MUTING IND.

IC404 MN4069UB CLOCK GENERATOR

Crystal O.S.C. (400kHz) X401 400kHz

IC403 (REC)

D411~416 SVDAY5533K-M REC IND.

D405~410 SVDPR5533K LED. DRIVE

IC402,403 M53242P LED DRIVE

E **F** LOUDNESS/ PHONO SELECTOR CIRCUIT

Volume control

S9-1 (LOUDNESS) Loudness

S9-2 (PHONO SELECTOR) Phono selector (cartridge)

G

TH201 100K TH202 100K

H TONE AMP./SUBSONIC FILTER/ TONE SELECTOR/TONE CONTROL/ MUTING CIRCUIT

D301 0A90

Q301, 302 2SK301 MUTING, AUDIO PRO.

IC301 SVINJM4560DX TONE AMP

Subsonic filter

SIO-1 (SUBSONIC FILTER)

S10-2 (TONE)

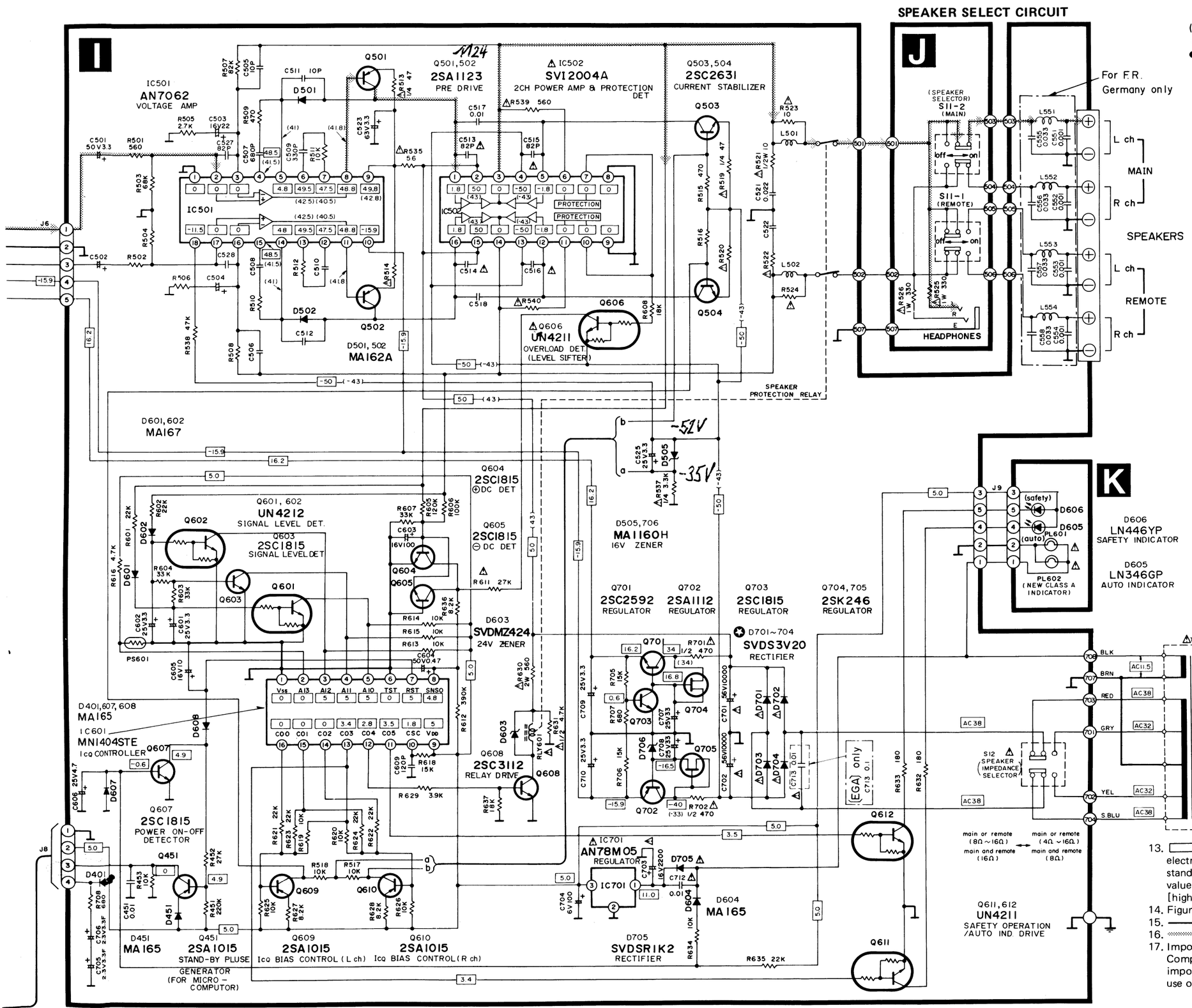
Treble control

Bass control

Tone selector

15 16 17 18 19 20 21 22 23 24

A B C D E F G



■ SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology).

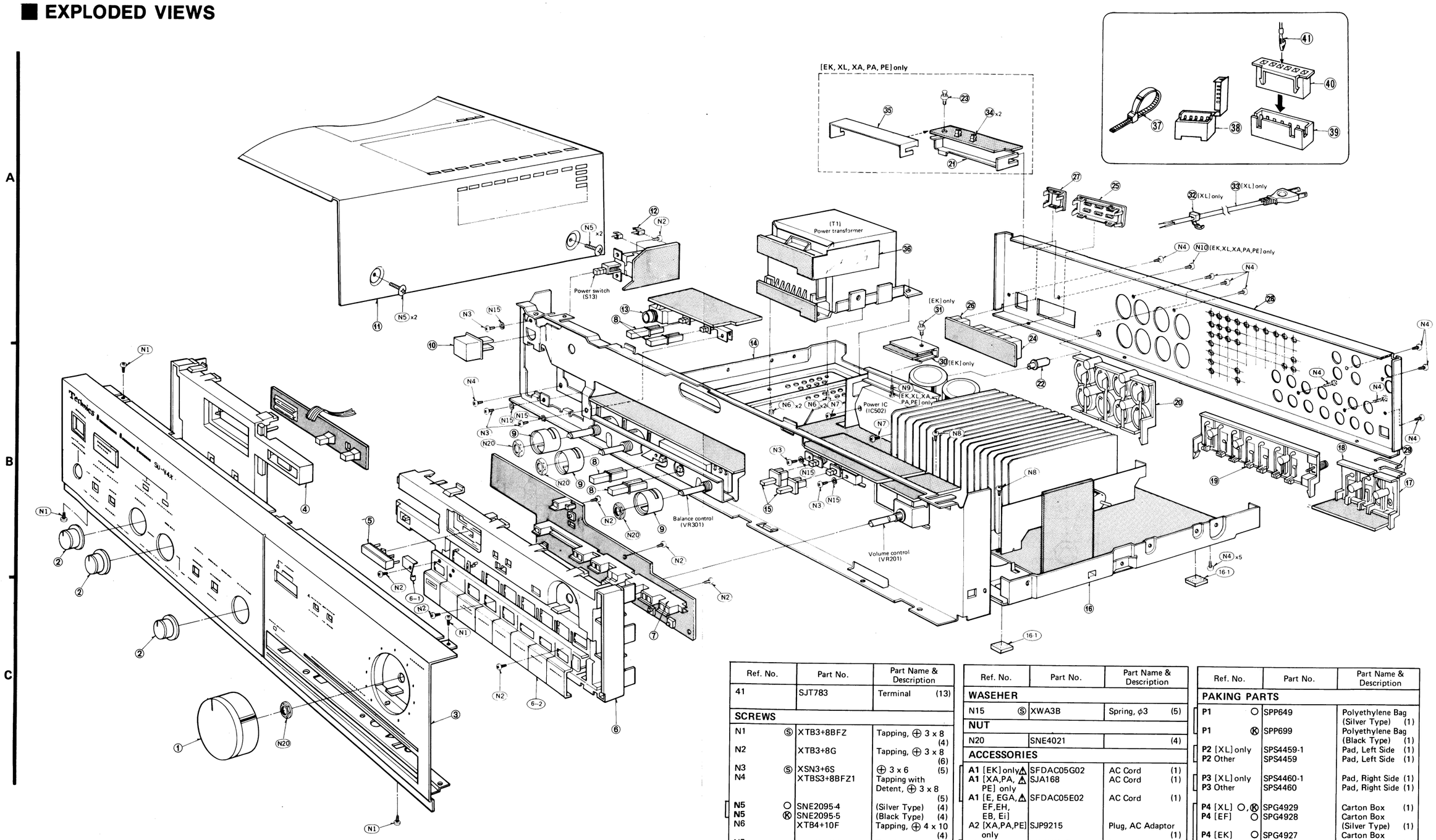
- **The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with ◘ mark, the production part No. are different from the replacement part No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.**

Notes:

1. **S1~S6** : Input selector switch in "**phono**" position.
   S1: phono, S2: tuner, S3: CD, S4: video/aux, S5: tape 1/DA tape, S6: tape 2
2. **S7** : Recording selector switch in "**off**" position.
3. **S8** : Muting switch in "**0dB**" position. (0dB ↔ −20dB)
4. **S9−1** : Loudness switch in "**off**" position. (■ on, ▂ off)
5. **S9−2** : Phono selector switch in "**MM**" position. (■ MM, ▂ MC)
6. **S10−1** : Subsonic filter switch in "**off**" position. (■ off, ▂ on)
7. **S10−2** : Tone switch in "**defeat**" position. (■ defeat, ▂ on)
8. **S11−1** : Main speakers selector switch in "**on**" position. (■ off, ▂ on)
9. **S11−2** : Remote speakers selector switch in "**off**" position. (■ off, ▂ on)
10. **S12** : Speaker impedance selector switch in "**8Ω ~ 16Ω/16Ω**" position. (■ 8Ω ~ 16Ω/16Ω, ▂ 4Ω ~ 6Ω/8Ω)
11. **S13** : Power switch in "**on**" position.
12. **S14** : Voltage selector switch in **"220V"** position. 110V ↔ 120V ↔ 220V ↔ 240V

13. ▭ Indicated voltage values are the atandard values for the DC electronic circuit tester (high impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester. [high tap → 8Ω~16Ω/16Ω]
14. Figures in ( ) standard for DC voltage in low tap.
15. ——— Positive (+B) voltage lines and negative (−B) voltage lines.
16. ▒▒▒ Phono signal lines of left channel.
17. Important safety notice:
    Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

■ EXPLODED VIEWS



Ref. No.	Part No.	Part Name & Description
41	SJT783	Terminal (13)
SCREWS		
N1 Ⓢ	XTB3+8BFZ	Tapping, ⊕ 3 x 8 (4)
N2	XTB3+8G	Tapping, ⊕ 3 x 8 (6)
N3 Ⓢ	XSN3+6S	⊕ 3 x 6 (5)
N4	XTBS3+8BFZ1	Tapping with Detent, ⊕ 3 x 8 (5)
N5 ○	SNE2095-4	(Silver Type) (4)
N5 Ⓚ	SNE2095-5	(Black Type) (4)
N6	XTB4+10F	Tapping, ⊕ 4 x 10 (4)
N7	XYN3+F14	Tapping, ⊕ 3 x 14 (2)
N8	XTW3+8L	Tapping, ⊕ 3 x 8 (3)
N9 [EK,XL,XA PA,PE] only	XYN3+F10S	Tapping, ⊕ 3 x 10 (2)
N10 [EK,XL, XA, PA, PE] only	XTBS3+8BFZ1	Tapping with Detent, ⊕ 3 x 8 (1)

Ref. No.	Part No.	Part Name & Description
WASEHER		
N15 Ⓢ	XWA3B	Spring, ϕ3 (5)
NUT		
N20	SNE4021	(4)
ACCESSORIES		
A1 [EK] only ⚠	SFDAC05G02	AC Cord (1)
A1 [XA,PA, ⚠ PE] only	SJA168	AC Cord (1)
A1 [E, EGA, ⚠ EF,EH, EB, Ei]	SFDAC05E02	AC Cord (1)
A2 [XA,PA,PE] only	SJP9215	Plug, AC Adaptor (1)
A3 [EGA]	SQF12138	Instruction Book (1)
A3 [XA]	SQF12139	Instruction Book (1)
A3 [PA, PE]	SQF12140	Instruction Book (1)
A3 Other	SQF12137	Instruction Book (1)

Ref. No.	Part No.	Part Name & Description
PAKING PARTS		
P1 ○	SPP649	Polyethylene Bag (Silver Type) (1)
P1 Ⓚ	SPP699	Polyethylene Bag (Black Type) (1)
P2 [XL] only	SPS4459-1	Pad, Left Side (1)
P2 Other	SPS4459	Pad, Left Side (1)
P3 [XL] only	SPS4460-1	Pad, Right Side (1)
P3 Other	SPS4460	Pad, Right Side (1)
P4 [XL] ○, Ⓚ	SPG4929	Carton Box (1)
P4 [EF] ○	SPG4928	Carton Box (Silver Type) (1)
P4 [EK] ○	SPG4927	Carton Box (Silver Type) (1)
P4 Other ○	SPG4926	Carton Box (Silver Type) (1)
P4 [EK] Ⓚ	SPG4931	Carton Box (Black Type) (1)
P4 Other Ⓚ	SPG4930	Carton Box (Black Type) (1)
P5 Ⓚ	SGK1413	Label (Black Type only) (2)

| | | |

■ REPLACEMENT PARTS LIST

Notes:

1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. Ⓚ-marked parts are used for black only, while ○-marked parts are for silver type only.
5. Part other than Ⓚ-and ○-marked are used for both black and silver type.
6. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.
7. The parenthesized numbers in the column of description stand for the quantity per set.

Ref. No.	Part No.	Part Name & Description
INTEGRATED CIRCUITS		
IC101	SVINJ4559DDM	Equalizer
IC201	TC9163N	Analog Function Switch
IC202	TC9164N	Analog Function Switch
IC301	SVINJM4560DX	Tone Amp.
IC401	UPD7506C043	Micro-Computor
IC402,403	M53242P	LED. Drive
IC404	MN4069UB	Clock Generator
IC501	AN7062	Voltage Amp.
IC502 ⚠	SVI2004A	Power Amp.
IC601	MN1404STE	ICQ Controller
IC701 ⚠	AN78M05	Regulator
TRANSISTORS		
Q101~104	2SK170-GR	FET Differential Amp.
Q301,302	2SK301-S	Muting
Q401,451,609 610	2SA1015-Y	Muting Control, Stand-By Pluse Generator ICQ Bias Control
Q403~405 606,611,612	UN4211	Switching, LED Drive Over Load Det., Safety Operation/ Auto Ind. Drive
Q501,502	2SA1123-R	Pre Drive
Q503,504	2SC2631-R	Current Stabilizer
Q601,602	UN4212	Signal Level Det.
Q603~605 607,703	2SC1815-Y	Signal Level Det., DC Det., Power ON-OFF Det., Regulator
Q608	2SC3112	Relay Drive
Q701	2SC2592-R	Regulator
Q702	2SA1112-R	Regulator
Q704,705	2SK246-Y	Regulator
DIODES		
D101,102,401 402,417,418 451,604,607 608	MA165	Switching
D403 405~410	SVDPR5533K	L. E. D.(Muting Input)
D404 411~416	SVDAY5533K-M	L. E. D.(REC)
D301	20A90	Switching
D501,502 Ⓢ	MA162A	Switching
D505,706	MA4160	Zener, 16V
D601,602	MA167	Switching
D603	SVDMZ424B	Zener, 24V
D605	LN346GP	L. E. D.(Auto)
D606	LN446YP	L. E. D.(Safety Operation)
D701~704 Ⓢ⚠	SVDS3V40	Rectifier
D705 Ⓢ⚠	SVDSR1K2	Rectifier
COIL and TRANSFORMER		
L1 [EGA] only	SLQZ650MH49	Choke
L101, 102 [EGA] only	SLM1Z33	L.P.F.
L501, 502	SLQY18G-10	Choke
L551, 552 [EGA] only	SLQY07G-30	Choke
L553, 554 [EGA] only	SLQY07G-30	Choke
T1 [E, EGA, EF, EH, EB, Ei]⚠	SLT5N441	Power Transformer
T1 [EK, XL, XA, PA, PE] ⚠	SLT5N442	Power Transformer

Ref. No.	Part No.	Part Name & Description
VARIABLE RESISTORS		
VR201	EWJKMA054B15	Volume Control, 100KΩ(B)
VR301	EWHF5AF25G15	Balance Control, 100KΩ(G)
VR302,303	EWCXEA011C15	Tone Control, 100KΩ(C)
CRYSTAL		
X401	SVFCSB400P-M	
THERMAL DETECTOR		
PS601	SRPBG47101	
THERMISTER		
TH201,202	RRT104	100Ω
RELAY		
RLY601 ⚠	SSY126	Speaker
LAMPS		
PL601,602 ⚠	XAMR74S17	Power ON Ind.
FUSES		
F1 [E, EGA, EF, EH, EB, Ei]⚠	XBA2C20TRO	250V, T2A
F1 [EK, XL, XA, PA, PE] ⚠	XBA2C40TRO	250V, T4A
F2 [EK, XL, XA, PA, PE] only ⚠	XBA2C20TRO	250V, T2A
SWITCHES		
S1~8	SSG13	Input, Tape, Rec, Muting
S9	SSH2083	Loudness, Phone Selector
S10	SSH2082	Subsonic Filter, Tone
S11	SSH2081	Speaker Selector
S12 ⚠	SSH1152	Speaker Impedance Selector
S13 ⚠	SSH1057-1	Power Source
S14[EK, XL, XA, PA, PE] ⚠ only	ESE37219	Voltage Selector

Ref. No.	Part No.	Part Name & Description
CABINET and CHASSIS PARTS		
1	SBN1125	Knob, Volume (1)
2	SBN1153	Knob, Bass Treble, Balance (3)
3 [PA, PE] only ○	SGWUV4X-SP	Front Panel, Ass'y (Silver Type) (1)
3 Other ○	SGWUV4X-SE	Front Panel, Ass'y (Silver Type) (1)
3 Ⓚ	SGWUV4X-KM	Front Panel Ass'y, (Black Type) (1)
4 ○	SGXUV4X-SE	Ornament (Silver Type) (1)
4 Ⓚ	SGXUV4X-KM	Ornament (Black Type) (1)
5 ○	SBC668	Button, Muting (Silver Type) (1)
5 Ⓚ	SBC668-1	Button, Muting (Black Type) (1)
6 ○	SGXUV4X-SE1	Ornament (Silver Type) (1)
6 Ⓚ	SGXUV4X-KM1	Ornament (Black Type) (1)

Ref. No.	Part No.	Part Name & Description
6-1	SUS767	Spring (1)
6-2 ○	SBC665	Button, Input Selector (1)
6-2 Ⓚ	SBC665-1	Button, Input Selector (1)
7	SMP380	Case, L.E.D. (1)
8	SBC399T	Button, Tone, Sub sonic Filter, Speakers (4)
9	SBX7701	Spacer, Bass, Treble, Balance (3)
10	SBC627	Button, Power Switch (1)
11 [EK] only○	SKCUV4X-SK	Cabinet (Silver Type) (1)
11 Other ○	SKC1670S1	Cabinet (Silver Type) (1)
11 [EK] only Ⓚ	SKCUV4X-KK	Cabinet (Black Type) (1)
11 Other Ⓚ	SKC1670BB1	Cabinet (Black Type) (1)
12	SJT347	Holder, Fuse (2)
13	SJJ71B	Jack, Headphones (1)
14 [EK, XL, XA, PA, PE]	SMLUV4X-SK	Bracket, Power Transformer (1)
14 [E,EGA,EF EH, EB, Ei]	SMLUV4X-KM	Bracket, Power Transformer (1)
15	SBC621	Button, Loudness, Phono Selector (2)
16 [XA,PA,PE]	SKUUV4X-SX	Button Board (1)
16 Other	SKUUV4X-SE	Botton Board (1)
[16-1	[SHS2481	Foot (2)
17	SJF3057-5N	Terminal Board, Phono (1)
18	SJF3057N	Terminal Board, Ext (1)
19	SJF3059N	Terminal Board, In/Out (1)
20	SJF4815-1	Terminal Board, Speaker (1)
21 [EK,XL,XA PA,PE] only	SMK59	Bracket (1)
22	SBC165	Button, Impedance Selector (1)
23 [EX,XL.XA PA,PE] only	SHR401-1	Lock Pin (1)
24 [XA,PA ⚠ PE] only	SJS9328B	Socket, AC Outlet (1)
25 [XA,PA PE] only	SJS9328A	Socket Cover, AC Outlet (1)
26 [XL] ⚠ except	SJS9231B	Socket, AC Inlet (1)
27 [XL] except	SJS9231A	Socket Cover, AC Inlet (1)
28 [EGA]	SGPUV4X-SG	Rear Panel (1)
28 [EK]	SGPUV4X-SK	Rear Panel (1)
28 [XL]	SGPUV4X-SL	Rear Panel (1)
28 [XA,PA,PE]	SGPUV4X-SX	Rear Panel (1)
28 [E,EF,EH, EB,Ei]	SGPUV4X-SE	Rear Panel (1)
29	SJP9205-2	Short Pin (2)
30 [EK] only	SMX852	Insulation Cover (1)
31 [EK] only	SHR401-1	Lock Pin (1)
32 [XL] only	SHR127	Bushing, AC Cord (1)
33 [XL] only⚠	RJA79ZAK	Accord (1)
34 [EK,XL,XA, PA,PE] only	SJT347	Holder, Fuse (2)
35 [EK,XL,XA, PA,PE] only	SMX842	Insulation Cover (1)
36	SMX475-1	Insulation Plate (1)
37	SHR301	Clamper (5)
38	SJS5421	Socket (4 Pin) (1)
38	SJS5519	Socket (5 Pin) (1)
39	SJT3321	Post (3 Pin) (1)
39	SJT3513	Post (5 Pin) (2)
40	SJS3321	Socket (3 Pin) (1)
40	SJS3513	Socket (5 Pin) (2)

■ RESISTORS & CAPACITORS

Notes:
1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. Important safety notice: Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
3. The "Ⓢ" mark is service standard parts and may differ from production parts.
4. The unit of resistance is Ω. (ohm). K = 1000Ω, M = 1000kΩ.
5. The unit of capacitance is μF. (microfarad). P = 10^{-6} μF.

Resistor Type	Wattage	Tolerance
ERD : Carbon ERG : Metal Oxide	S2 : 1/4W 25 : 1/4W 2 : 2W S1 : 1/2W	J : ±5% G : ±5%

Capacitor Type	Voltage		Tolerance
	ECEA Type	Other	
ECEA : Electrolytic ECCD : Ceramic ECKD : Ceramic ECQM : Polyester ECET : Electrolytic ECEA...N : Non Polar Electrolytic EECW : Liquid electrolyte double layer capacitor	0J : 6.3V 1C : 16V 1E : 25V 1H : 50V 1J : 63V	1H : 50V KC : 400V AC 2H : 500V	K : ±10% Z : +80%, −20% P : +100%, −0% M : ±20%

● RESISTORS

Ref. No.	Part No.	Value
R101,102	ERDS2TJ473	47K
R103,104	ERDS2TJ220	22
R105,106	ERDS2TJ332	3.3K
R107,108	ERDS2TJ332	3.3K
R109,110	ERDS2TJ332	3.3K
R111,112	ERDS2TJ151	150
R113,114	ERDS2TJ101	100
R117,118	ERDS2TJ151	150
R119,120	ERDS2TJ823	82K
R121,122	ERDS2TJ682	6.8K
R123,124	ERDS2TJ334	330K
R125,126	ERDS2TJ561	560
R127,128	ERDS2TJ100	10
R129,130	ERDS2TJ221	220
R151, 152 [EGA] only	ERDS2TJ102	1K
R153, 154 [EGA] only	ERDS2TJ102	1K
R201,202	ERDS2TJ333	33K
R203,204	ERDS2TJ392	3.9K
R205,206	ERDS2TJ272	2.7K
R207,208	ERDS2TJ183	18K
R209,210	ERDS2TJ101	100
R211,212	ERDS2TJ473	47K
R213, 214 [EGA] only	ERDS2TJ182	1.8K
R215, 216 [EGA] only	ERDS2TJ182	1.8K
R217, 218 [EGA] only	ERDS2TJ182	1.8K
R219, 220 [EGA] only	ERDS2TJ182	1.8K
R221, 222 [EGA] only	ERDS2TJ182	1.8K
R301,302	ERDS2TJ824	820K
R303,304	ERDS2TJ561	560
R305,306	ERDS2TJ154	150K
R307,308	ERDS2TJ224	220K
R309,310	ERDS2TJ223	22K
R311,312	ERDS2TJ392	3.9K
R315,316	ERDS2TJ183	18K
R317,318	ERDS2TJ562	5.6K
R319,320	ERDS2TJ102	1K
R321,322	ERDS2TJ223	22K
R323,324	ERDS2TJ392	3.9K
R325	ERDS2TJ334	330K
R327,328	ERDS2TJ224	220K
R401	ERDS2TJ473	47K
R402,403	ERDS2TJ104	100K
R404,405	ERDS2TJ104	100K
R406	ERDS2TJ472	4.7K
R408,409	ERDS2TJ181	180
R410	ERDS2TJ824	820K
R411,412	ERDS2TJ181	180
R413	ERDS2TJ472	4.7K
R414	ERDS2TJ103	10K
R451	ERDS2TJ224	220K
R452	ERDS2TJ273	27K
R453	ERDS2TJ103	10K
R501,502	ERDS2TJ561	560
R503,504 ⚠	ERDS2TJ823	82K
R505,506	ERDS2TJ272	2.7K
R507,508	ERDS2TJ823	82K
R509,510	ERDS2TJ471	470
R511,512	ERDS2TJ103	10K
R513,514 ⚠ Ⓢ	ERD25FJ470	47
R515,516	ERDS2TJ471	470
R517,518	ERDS2TJ103	10K
R519,520 ⚠ Ⓢ	ERD25FJ470	47
R521,522 ⚠	ERDS1FJ100	10
R523,524 Ⓢ	ERD25FJ100	10
R525,526	ERG1ANJ331	330
R535 ⚠ Ⓢ	ERD25FJ5R6	5.6
R537 ⚠ Ⓢ	ERD25FJ332	3.3K
R538	ERDS2TJ473	47K
R539,540 ⚠ Ⓢ	ERD25FJ561	560
R601,602	ERDS2TJ223	22K
R603,604	ERDS2TJ333	33K
R605	ERDS2TJ124	120K
R606	ERDS2TJ104	100K
R607	ERDS2TJ333	33K
R608	ERDS2TJ183	18K
R611 ⚠	ERDS2TJ273	27K
R612	ERDS2TJ394	390K
R613,614	ERDS2TJ103	10K
R615	ERDS2TJ103	10K
R616	ERDS2TJ472	4.7K
R618	ERDS2TJ153	15K
R619,620	ERDS2TJ103	10K
R621,622	ERDS2TJ223	22K
R623,624	ERDS2TJ223	22K
R625,626	ERDS2TJ103	10K
R627,628	ERDS2TJ822	8.2K
R629	ERDS2TJ392	3.9K
R630 ⚠	ERG2ANJ561	560
R631 ⚠	ERDS1FJ472	4.7K
R632,633	ERDS2TJ181	180
R634	ERDS2TJ103	10K
R635	ERDS2TJ223	22K
R636	ERDS2TJ822	8.2K
R637	ERDS2TJ183	18K
R701,702 ⚠	ERDS1FJ471	470
R705,706	ERDS2TJ153	15K
R707,708	ERDS2TJ681	680

● CAPACITORS

Ref. No.	Part No.	Value
C1 ⚠	ECKDKC103PF	0.01
C101,102 Ⓢ	ECCD1H820K	82P
C103,104	ECEA0JU222	2200
C105,106 Ⓢ	ECKD1H222ZF	0.0022
C107,108	ECQM1H393KV	0.039
C109,110	ECQM1H103KV	0.01
C111,112	ECQM1H122KV	0.0012
C113,114 ⚠	ECEA1HN010S	1
C115,116	ECQM1H472JZ	4700
C117,118 Ⓢ	ECKD1H103ZF	0.01
C151, 152 Ⓢ [EGA] only	ECCD1H680K	68P
C201,202	ECEA1EU101	100
C203,204	ECQM1H563KV	0.056
C205, 206 Ⓢ [EGA] only	ECCD1H101K	100P
C207, 208 Ⓢ [EGA] only	ECCD1H101K	100P
C209, 210 Ⓢ [EGA] only	ECCD1H101K	100P
C211, 212 Ⓢ [EGA] only	ECCD1H101K	100P
C213, 214 Ⓢ [EGA] only	ECCD1H101K	100P
C215, 216 Ⓢ [EGA] only	ECCD1H820K	82P
C301,302	ECQM1H563KV	0.056
C303,304	ECEA1HU3R3	3.3
C305,306 Ⓢ	ECCD1H820K	82P
C307,308	ECQM1H153KV	0.015
C309,310	ECQM1H823JZ	0.082
C311,312	ECQM1H182JZ	0.0018
C313,314	ECQM1H183KV	0.018
C315,316	ECEA1EU4R7	4.7
C317	ECEA1HUR22	0.22
C319,320 Ⓢ	ECCD1H390K	39P
C321,322	ECEA1EU100	10
C401	ECEA1CU100	10
C403,404 Ⓢ	ECCD1H121K	120P
C405,406 Ⓢ	ECKD1H102ZF	0.001
C451 Ⓢ	ECKD1H103ZF	0.01
C501,502	ECEA1HU3R3	3.3
C503,504 ⚠	ECEA1CU220	22
C505,506 ⚠Ⓢ	ECCD1H100KC	10P
C507,508 Ⓢ	ECKD1H681KB	680P
C509,510 Ⓢ	ECKD1H331KB	330P
C511,512 Ⓢ	ECCD2H100K	10P
C513,514 Ⓢ	ECCD2H820K	82P
C515,516 Ⓢ	ECCD2H820K	82P
C517,518 Ⓢ	ECKD1H103MD	0.01
C521,522 Ⓢ	ECKD1H223ZF	0.022
C523	ECEA1JU3R3	3.3
C525	ECEA1EU3R3	3.3
C527,528 Ⓢ	ECCD1H820K	82P
C551, 552 Ⓢ [EGA] only	ECKD1H102MD	0.001
C553, 554 Ⓢ [EGA] only	ECKD1H102MD	0.001
C555, 556 [EGA] only	ECQM1H333KV	0.033
C557, 558 [EGA] only	ECQM1H333KV	0.033
C601,602	ECEA1EU3R3	3.3
C603	ECEA1CU101	100
C604	ECEA1HUR47	0.47
C605	ECEA1CU100	10
C606	ECEA1EU4R7	4.7
C609 Ⓢ	ECCD1H121K	120P
C701,702 ⚠	ECETS56V103U	10000
C703 ⚠	ECEA1CU222	2200
C704	ECEA0JU101	100
C705,706	EECW2R3A3R3	3.3F
C707,708	ECEA1EU330	33
C709,710	ECEA1EU3R3	3.3
C712 ⚠Ⓢ	ECKD1H103ZF	0.01
C713 [EGA] only	ECQE10104V	0.1
C713 [EGA] except Ⓢ	ECKD2H103PE	0.01

Printed in Japan
840709800 Ⓚ SH/TN